Measurement of Neutron Decay Parameters – The abBA Experiment

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We are developing an experiment to measure the correlations a, A, and B, and the fierz interference term b in neutron decay, with a precision of approximately 10^{-4}. The experiment uses an electromagnetic spectrometer in combination with two large-area segmented silicon detectors to detect the proton and electron from the decay in coincidence, with 4π acceptance for both particles. For the neutron-polarization-dependent observables A and B, precision neutron polarimetry is achieved through the combination of a pulsed neutron beam, under construction at the SNS, and a polarized ^{3}He neutron polarizer. Measuring a and A in the same apparatus provides a redundant determination of $\lambda = g_A/g_V$. Uncertainty in λ dominates the uncertainty of CKM unitarity tests.

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